

REMARKS

Claims 1, 3-19, 21-23, 25, and 27-35 are pending in the application and are at issue.

Claim 8 has been amended to incorporate a feature deleted from claim 9 which provides support for this amendment. Claims 15 and 35 have been amended to correct an obvious typographical error. Claims 8 and 10 have been amended to improve the form of the claims.

The present claims are directed to an ester compound, process of preparing the ester, a crosslinked hydrogel, and articles containing the crosslinked hydrogel. The ester compound is a tri(meth)acrylate of alkoxyated trimethylolpropane. Independent ester claim 1 clearly recites tri(meth)acrylate compounds Ib and Ic. In claim 1, the trimethylolpropane is alkoxyated in a blockwise fashion, e.g., first ethoxyated, then propoxyated, (e.g., Compound Ib) or first propoxyated, then ethoxyated (e.g., Compound Ic). The compound also can contain butoxy groups (e.g., claim 10). A (meth)acrylic acid unit then is positioned at each of the three terminal ends of the alkoxyated trimethylolpropane. This is attained by utilizing a molar excess of (meth)acrylic acid to insure that all terminal hydroxyl groups are reacted (e.g., claims 8, 10, 14), wherein the molar excess of (meth)acrylic acid is specifically recited). In addition, the molar excess of (meth)acrylic acid is not removed from the reaction mixture (e.g., claims 9, 11, 13, 28, and 30).

The claimed esters are hydrophilic having 28 to 60 total moles of ethylene oxide ($n_1 + n_2 + n_3$) and

only 4 to 13 total moles of propylene glycol ($m_1 + m_2 + m_3$) (see claim 1). The maximum number of total moles of alkoxy units is 73 in claim 1 and 75 in claim 10. The esters are utilized as crosslinking agents in the formation of superabsorbent hydrogel, which in turn are used in absorbent articles, such as diapers. Superabsorbent hydrogels prepared using a presently claimed ester as a crosslinking agent contain a reduced amount of crosslinker residue, see specification page 53, and compare examples d. through g. to the inventive examples a. through c. in the table.

Claims 1, 3-19, 21-23, 25, and 27-35 stand rejected under 35 U.S.C. §102(b) as being anticipated by Faul et al. U.S. Patent No. 5,661,220 ('220). The examiner contends that the '220 patent teaches the claimed ester compound. Applicants traverse this rejection.

The '220 patent teaches reaction products useful as demulsifiers for crude oil emulsions. The reaction product results from a three step process. First, a carboxylic acid I (which can be (meth)acrylic acid) is condensed with a polyetherol II (which can be an alkoxyated trimethylolpropane), wherein molar ratio of II to I is from 2:1 to 10:1. Importantly, the amount of polyetherol II is present in excess, thus insuring the presence of unreacted terminal hydroxyl groups on the polyetherol II. The resulting condensate product then is polymerized with an unsaturated carboxylic acid and other optional monomers, such that "not all hydroxyl groups are converted" (see '220 patent, abstract and column 1, lines 45-46 for example).

At column 4, lines 9-36, the condensates of the '220 patent are more fully disclosed, i.e., carboxylic acids I are condensed "in the presence of a molar excess of polyetherol II" (lines 10-12) and "process step A) . . . essentially contains the condensate and unconverted polyetherol II" (lines 27-29).

At column 5, lines 29-35, the '220 patent further teaches that the products of the '220 patent are *hydrophobic*, i.e., are soluble in an oil phase. The '220 patent examples further show that the '220 patent compounds are hydrophobic. In particular, A2 and A3 of the examples, at columns 6 and 7, contain 1 mole of trimethylolpropane condensed with 60 moles of propylene oxide and 10 moles of ethylene oxide, and 80 moles of propylene oxide and 30.3 moles of ethylene oxide, respectively. Therefore, the '220 patent teachings are limited hydrophobic alkoxyated trimethylolpropanes containing far greater amounts of propylene oxide compared to ethylene oxide. The condensate of the '220 patent is prepared using an excess of polyetherol II, and therefore a (meth)acrylic acid unit cannot be present at each terminal end of the condensate.

The presently claimed esters differ substantially from the condensate products of the '220 patent. First, the esters of claim 1 are tri(meth)acrylates. Each terminal hydroxy group of the trimethylolpropane is capped with a (meth)acrylic acid unit, which is accomplished by using an excess amount of (meth)acrylic acid in the reaction. The '220 condensate products will not be tri(meth)acrylates because the reference

teaches a 2:1 to 10:1 mole ratio of polyetherol to carboxylic acid, which precludes formation of the claimed tri(meth)acrylate. The '220 patent also teaches that *not all* hydroxyl groups are to be reacted, which is a teaching *contrary* to the present invention.

Second, the presently claimed ester compounds are hydrophilic compounds containing at least two times more ethylene oxide than propylene oxide units. The condensation products of the '220 patent are hydrophobic compounds containing 2.5 to 6 times less ethylene oxide than propylene oxide, i.e., Examples A2 and A3. The '220 patent fails to teach or suggest a hydrophilic product containing more ethylene oxide units than propylene oxide units.

Third, the methods of producing the esters utilize an excess amount of (meth)acrylic acid, e.g., see claims 8, 10, and 14, and allow the excess to remain in the reaction product (e.g., see claims 9, 11, 13, 28, and 30). This excess amount of (meth)acrylic acid ensures that *all* terminal hydroxyl groups of the alkoxyated trimethylolpropanes are consumed. In contrast, the '220 patent specifically teaches that the amount of polyetherol II is in excess (column 4, lines 10-12), which is the exact opposite of the presently claimed invention, and such that excess (meth)acrylic acid will not be present in the reaction product.

In view of the substantial differences between the disclosure of the '220 patent and the present claims, it is submitted that the rejection of the present claims under 35 U.S.C. §102(b) is in error and should be withdrawn. It is further submitted that the

present claims would not have been obvious over the '220 patent under 35 U.S.C. §103 for the reasons set forth above and hereafter.

The product of the '220 patent, and the intermediate products, all are hydrophobic compounds that are designed for *oil solubility* to act as a demulsifier. The '220 patent teaches using an excess polyetherol and retaining some unreacted hydroxyl groups in the reaction product.

In contrast, the present claims are directed to a *hydrophilic* ester compound, which can be used in an aqueous polymerization process to form superabsorbent polymers. The present esters are prepared using an excess of (meth) acrylic acid, which is the exact opposite of the '220 patent teachings. The excess amount of (meth)acrylic acid ensures the preparation of a tri(meth)acrylate, as claimed, which also is in direct contrast to the '220 patent. The '220 patent discourages the formation of a tri(meth)acrylate by using excess polyetherol.

A person skilled in the art, after reading the '220 patent, would not have been motivated to make the radical modifications necessary to arrive at the presently-claimed invention. The '220 patent teaches hydrophobic products that would not be useful in preparing superabsorbent polymers. A hydrophobic component would adversely effect the water absorbent properties of such a polymer.

Overall, a person skilled in the art would have to totally redesign the condensate product of the '220 patent to arrive at the presently claimed inven-

tion. The skilled person would have to act completely contrary to the teachings of the '220 patent, i.e., invert the mole ratio of hydrophobic alkylene oxide to hydrophilic alkylene oxide and invert the mole ratio of alkoxyated trimethylolpropane to (meth)acrylic acid.

Not only do such drastic changes from the teachings of the '220 patent result in a completely different product from the '220 patent, but the '220 patent provides no incentive for a person skilled in the art to consider making such drastic changes. It is further submitted that the subject matter of the '220 patent (oil demulsifiers) is so different from the field of the subject matter of the present claims (i.e., superabsorbent polymers and crosslinkers therefor) that persons skilled in the art of superabsorbent polymers would not even consider the nonanalogous '220 patent.

In summary, for the reasons set forth above, not only are the present claims novel over the '220 patent, but the present claims also would not have been obvious over the '220 patent under 35 U.S.C. §103.

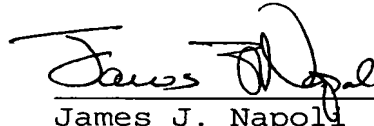
It is submitted that the claims are in a proper form for allowance. An early and favorable action on the merits is requested.

Should the examiner wish to discuss the foregoing, or any matter of form in an effort to advance this application toward allowance, the examiner is urged to telephone the undersigned at the indicated number.

Respectfully submitted,

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By

A handwritten signature in black ink, appearing to read "James Napoli", written over a horizontal line.

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